

Diager Industrie: A Strong Partner for the Aerospace Industry



Ever since its founding in 1953 by Pierre and Denise Defougeres, Diager Industrie, a subsidiary of the renowned Diager Group, has specified quality, precision, and innovation. The company, based in Poligny in the picturesque French Jura region near the Swiss border, is a leading supplier of solid carbide special tools for the aerospace, automotive, and energy technology industries. Today, Diager Industrie, with around 80 highly qualified employees, produces almost one million high-tech tools annually. Together with its parent company, which has a total of 360 employees, the company is driving technological advances. Diager Industrie is committed to excellent customer service and uncompromising product quality. Thanks to state-of-the-art technologies and the commitment of its employees, every effort is made to reduce the impact on the environment. Diager Industrie relies on sustainable production methods and is continuously reducing its environmental impact by using the latest technologies.

Industry focus and specialties

The tool portfolio quickly reveals the strength of the partnership and innovation in the field of aeronautics: it includes many HVM special milling cutters for machining light metals, plastics, and composite materials. Operations on plastics and light metals are often carried out with tools that have only one cutting edge. Diager Industrie offers a wide range of end mills for such "soft materials" and manufactures them in large series.

Components for aeronautics must be very light yet as strong as steel. These requirements are met by plastics that are reinforced with fibers (e.g., glass, carbon, or others). Such composite materials are very difficult to machine. Consequently, high demands are placed on the tools, and above all, a great deal of experience is required for their design. Diager Industrie has built up this know-how over generations and uses it for the success of its end customers.

The company maintains strong partnerships with well-known companies in the aerospace, energy, mechanical engineering, and automotive industries and focuses exclusively on the development and manufacture of customized cutting tools.

Other highlights of the product portfolio include tools for drilling, milling, and reaming operations, which are optimized through innovative processes. 35% percent of production is standard end mills, while 65% is custom specialty end mills. Diager Industrie also offers comprehensive services, including tool maintenance and resharping.

Technology and manufacturing expertise

One of the keys to Diager Industrie's success is its close collaboration with NUMROTO. The software is ideally suited for the production of form milling cutters and special tools that require the highest precision. NUMROTO also supports tool preparation with a perfectly adapted solution for cylindrical grinding and end operations.

Diager relies on a pool of 135 machines, 45 of which are CNC tool grinding machines from leading suppliers. These include many NUMROTO machines from the manufacturers Vollmer, Strausak, Reinecker, and TTB. These machines cov-

er the entire manufacturing process from cylindrical grinding to finish grinding. Each of the machines mentioned has its specialties: one can grind very small dimensions with micrometer precision, while the other can optimally grind large diameters or long workpieces. Nevertheless, NUMROTO is always operated in the same way, so Diager Industrie can save a lot of effort in training operating personnel.

The NUMROTO machines are equipped with automatic loaders and robots, so that series of up to 300 tools can often be produced overnight or on weekends. It is important that the ground geometry, such as the diameter or flute depths, is monitored with in-process measurement so that consistently high product quality can be guaranteed.

Thanks to NUMROTO's intuitive 3D simulation, every tool can be analyzed down to the smallest detail before production. The software enables high-resolution visualization of the tool if required and prevents potential sources of error with automatic wheel removal and collision checks. Cyril



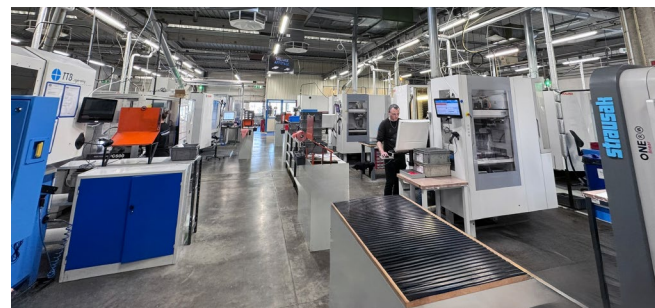
From left to right: Jörg Federer, Head of Application Technology NUMROTO, Gaspard Metra, Methods Manager Diager Industrie, Gustav Heer, Application Technology NUMROTO, Alanis Brelot, CNC set-up operator Diager Industrie and Cyril Jacqueson NUMROTO Specialist Diager Industrie

Jacqueson, a machine technician with over ten years of experience, emphasizes: "NUMROTO is pragmatic and easy to use – an indispensable software in our manufacturing process."

The NUMROTO Draw function provides precise technical drawings that enable consistent and traceable documentation of existing and new tools. Vectorized NUMROTO 3D tool views are generated automatically, saving time and money when creating product documentation while providing flexibility to customize dimensioning and layout.



The partnership specifies that the focus is on expertise and innovative technologies



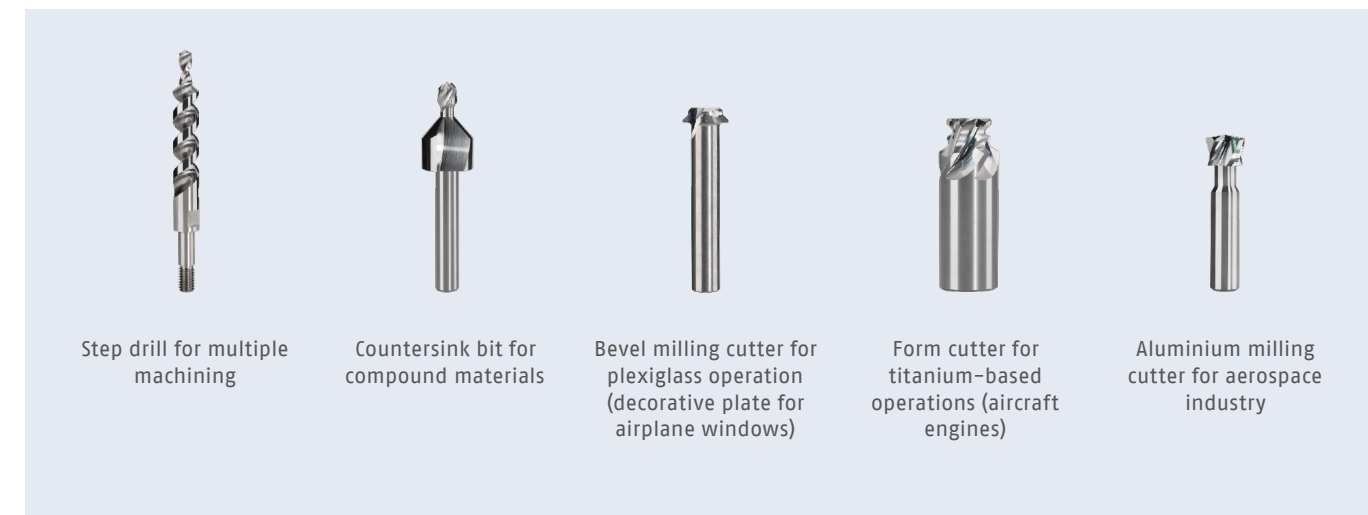
Diager Industrie's state-of-the-art machinery

Successful applications in practice

Diager Industrie's multi-function tools and form end mills are used for a wide range of applications, particularly in the aerospace industry. Examples of successful applications include form end mills for machining aircraft windows, multi-function tools for drilling, countersinking, and milling, as well as tools for machining demanding materials such as Kevlar, aluminum, and wood.

A look into the future

Diager Industrie is a future-oriented company with a long family tradition. The latest technology, a committed team, and a strong customer focus guarantee that the success story will continue. In collaboration with NUMROTO, the company is setting standards in cutting tool technology – to the delight of customers worldwide.



Step drill for multiple machining

Countersink bit for compound materials

Bevel milling cutter for plexiglass operation (decorative plate for airplane windows)

Form cutter for titanium-based operations (aircraft engines)

Aluminium milling cutter for aerospace industry

numroto flash

Issue 28, April 2025

Where Innovation Meets Tradition: The Future of Precision Engineering

We are pleased to present the latest edition of NUMROTOflash. This edition combines innovation and tradition and offers exciting insights into the current advances in tool technology.

Its close collaboration with NUMROTO illustrates how partnerships help to achieve technical excellence.

A central focus is the introduction of NUMROTO X, our new software generation. With a clearly structured user interface, innovative modules and a flexible architecture, NUMROTO X offers new possibilities for efficiently and precisely manufacturing both complex standard tools and customized special solutions. The integration of 3D simulation and intuitive operation guarantee the highest quality and user-friendliness – a significant step forward for our customers worldwide.

Another highlight of this edition is the change of leadership in our application technology: after 37 successful years, we bid farewell to Jörg Federer as he enters his well-deserved (part-time) retirement. Taking over the role is Benjamin Matthes, a capable successor who is looking forward to continuing the success story and setting new standards.

We warmly invite you to visit us at the upcoming trade fairs to experience the innovations of NUMROTO up close. Let us shape the future of precision technology together.

We are particularly proud of our partnership with Diager Industrie, a leading manufacturer of cutting tools. Its innovative manufacturing expertise and high standards of quality and precision make Diager Industrie a role

Best regards,

Andreas Hartig
CSO West

Adrian Kiener
CSO Asia



Exhibitions 2025/26 NUMROTO is there

NUM will be showcasing NUMROTO at various trade shows around the world this year. We'll be unveiling the latest NUMROTO innovations and will be available for engaging discussions. Join us at the mentioned trade shows. Our team is excited to meet you.

You can locate our halls and booth numbers on our website num.com before the expo begins.

Additionally, many machine manufacturers will be present with machines equipped with NUM CNC systems and NUMROTO.



NUMROTO X: Modern, Intuitive, Flexible

Handover in Application Engineering

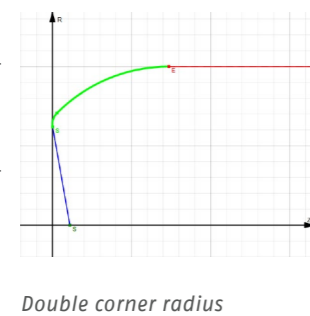
NUMROTOplus Release Notes 5.2.0 Compared to 5.1.0

NUMROTO X is available in its first version and is suitable both as a supplement to NUMROTOplus and as a standalone operating software for tool grinding machines. The new software impresses with a modern, clearly structured user interface and, thanks to its uniform operating concept, enables a quick start as well as a high degree of flexibility in tool design.

The first release of NUMROTO X includes the infrastructure and milling module. Additional modules for manufacturing and reshaping other tool types such as drills, indexable inserts, hobs, or burrs will be added successively in the coming years. NUMROTO X and NUMROTOplus can be easily operated side by side on the same system, ensuring the availability of the required operations and functions as well as a smooth transition.

Complex standard milling cutters

The milling module is dedicated to the production of complex standard milling cutters and impresses with a large selection of predefined external shapes and individually selectable geometry elements. To define the outer shape, you can specify several cylinder shapes, corner shapes, and face shapes, which can be combined with each other as you wish. While predefined radii in convex and concave versions are also available for the cylinder shapes to create barrel and circle segment milling cutters, the face shapes have been extended to include the option of radius face shapes to create lens face and double-radius milling cutters. In addition to the standard corner forms, such as corner radius and corner chamfer, a double corner radius can also be selected. The combinations lead to a multitude of possible external profiles, for which exact cutting lines are calculated according to the twist parameters. Cutting-relevant operations take exactly these cutting lines as a basis and thus produce an exact external shape with the highest precision.



Flexible geometry and machining data

Thanks to the strict separation of geometry information and machining parameters, flexibility in the design of the external shape is also extended to the geometric definition of the cutting edges. Geometry definitions such as relief angle, rake angle, twist, or flute depth can be defined either for all teeth together, independently of the operation, or multiplied as required and assigned directly to individual teeth or tooth groups. In the same way, face cutting and center geometries can be defined, making operation consistent and intuitive. The geometry information is clearly organized in chapters and can be easily viewed thanks to the scrollable range.

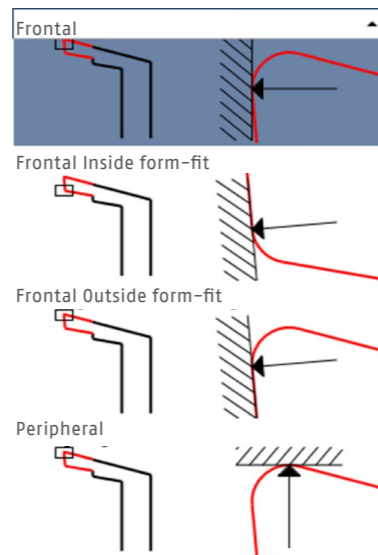
Zentrumsgeometrien			
Zentrumsgeometrie A	Mass vor Mitte: 0.1000 mm	Abstand zum Zentrum: 0.2000 mm	Zahnanzahl: 12
Zentrumsgeometrie B	Mass vor Mitte: 0.1000 mm	Abstand zum Zentrum: 0.4000 mm	Zahnanzahl: 12
Zentrumsgeometrie C	Mass vor Mitte: 0.1000 mm	Abstand zum Zentrum: 0.1000 mm	Zahnanzahl: 12

Configuration of the center geometries

The machining data is also clearly organized by chapter in the familiar way in the machining steps, which are summarized in sequences in a tabular format. The machining steps can be easily and intuitively added and removed, moved, and run individually. Flags are used to indicate problems or invalid entries. The great flexibility in creating tool programs is also evident in the option of creating any number of sequences per tool. This makes it easy to manage different machining parameters or production sequences for the same tool in a central location. Each sequence has its own real-time preview and can be checked for possible collisions or process errors using the proven NUMROTO-3D process simulation. In addition to production sequences with grinding and measuring operations, wheel sequences with measuring and dressing processes or machine sequences for probe calibration can also be created. Thanks to the consistency of this function, the user quickly finds his way around in the new software, and the possibility that sequences can also call other sequences as subroutines shows the impressive flexibility in the design of production processes.

Universally applicable grinding wheels

Different grinding operations require different grinding wheels, and these can in turn be used in different ways. Here, too, NUMROTO X offers a flexible solution, in which, in principle, any wheel can be selected for any operation. The user selects from various predefined wheel contact points to position the wheel as desired. In the case of form wheels, the user defines not only the outer geometry but also the contact points, which he can create in any number and label with his usual designations.

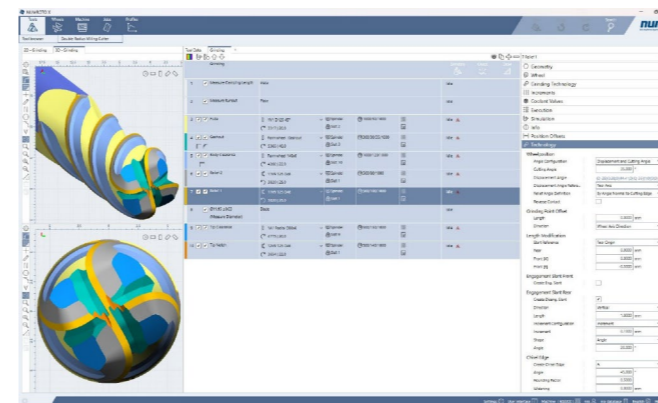


Disk engagement

New package model

NUMROTO X is offered in modules, with each module being available in up to three levels: Basic, Advanced, and Professional. With this strategy, NUMROTO X pursues a modern licensing concept in which all functionalities are specified for the user, but to different extents.

NUMROTO X has a fresh, modern design and combines decades of experience in developing tool grinding software with innovative ideas and forward-thinking approaches. New options allow for more flexible tool programming, but this means that existing tool programs from NUMROTOplus cannot be transferred identically to the new software. However, one thing is clear: "NUMROTO remains NUMROTO." Existing NUMROTOplus users will quickly find their way around NUMROTO X and quickly come to appreciate the new functions and possibilities.



Passing the baton in application engineering: Jörg Federer hands over to Benjamin Matthes

After more than 37 years at NUMROTO, Jörg Federer is taking a well-deserved transition into retirement and reducing his workload to 50%. His impressive career, characterized by innovation, team spirit, and extraordinary projects, began in 1988. Together with his team, he laid the foundation for the NUMROTO software as a software developer.

The NUMROTO project developed well, and after less than two years of development, the first milestone was reached: a well-known aircraft turbine manufacturer purchased four tool grinding machines to grind conical ball-end mills with NUMROTO. Over the years, numerous personal contacts with end users and OEM partners have contributed significantly to the success of NUMROTO.

Highlights and management philosophy

In the 2000s, Jörg Federer took over as head of application technology. Under his leadership, the team grew continuously – shaped by an exceptionally cooperative working atmosphere. "The remarkable team spirit has characterized our project from the very beginning and continues unchanged to this day," emphasizes Jörg Federer.

Jörg Federer has experienced the development of the industry intensively over decades. "In the past, the main focus was on reshaping standard tools, but today, highly precise special tools are specified, which could only be developed thanks to 3D simulation."

"What I will miss most are the challenges and the satisfaction of successfully meeting our customers' needs," he says. His message to the NUMROTO team: "Focusing on our customers' needs has always been our key to success and will remain so in the future."

The next generation in application technology

Benjamin Matthes, who has been with NUMROTO since 2011, is taking over as head of application technology. "I see application technology as a bridge between product management and the end customer," explains Benjamin Matthes. "My job is to maintain this bridge and, if necessary, expand it."

Jörg Federer leaves Benjamin Matthes an excellent and harmonious team. A particular focus is on the transfer of know-how between experienced and young team members, as well as NUMROTOplus and NUMROTO X, to ensure that NUMROTO continues to meet the highest standards in the future.

"I am very grateful for the instructive collaboration with Jörg over the past 14 years," says Benjamin Matthes. "His knowledge and experience have shaped our team."

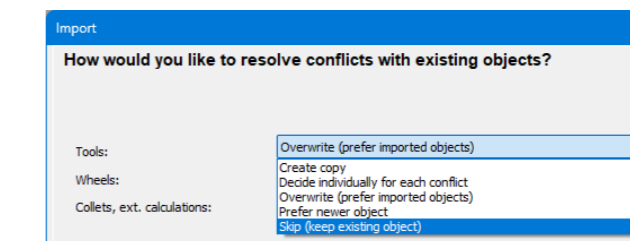
While Jörg Federer is looking forward to the benefits of retirement, Benjamin Matthes is motivated to continue developing the application technology work with his team and to continue the success story of NUMROTO.



Jörg Federer and Benjamin Matthes – a handshake to symbolize a successful handover and a trusting collaboration in application technology

General

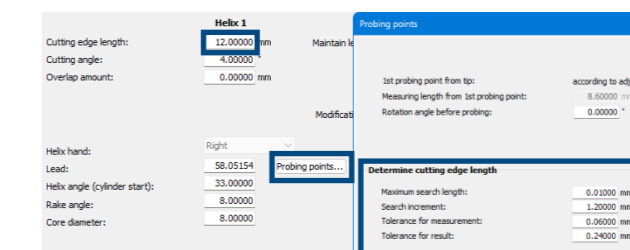
- When importing objects, you can now specify how to handle conflicts.



- In the 2D simulation, double-clicking on a run that was being simulated could cause the wrong operation to open. This problem occurred particularly when using Windows screen scaling.
- The new Profile Editor-X is now able to display comparative profiles.
- Depending on the feed and the wheel speed, the distance per wheel revolution is now displayed. This value can be used to estimate the surface roughness if the grinding wheel is not running completely round or flat.

End Mill

- On an up-down end mill, the cutting length of helix 1 and helix 2 can now be determined using the probe.



- When resharping up-down end mills, the cutting length of helix 1 was no longer shortened according to the tip removal.

Drill

- Various optimizations for the flute X when used in a drill program.

NR-Draw

- Two new user rights have been added for NUMROTO Draw: opening and saving drawings.

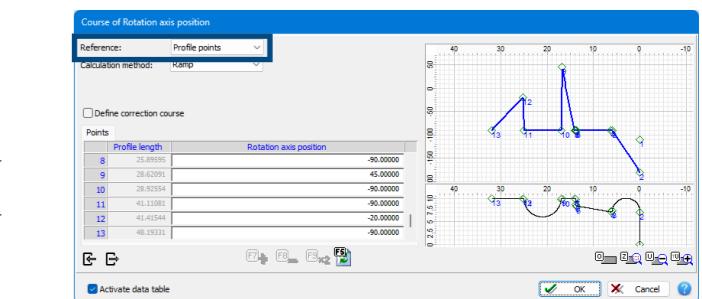
NCI

- The remaining grinding time now takes into account the position of the feed potentiometer when calculating the grinding time that has already elapsed.
- If the "handwheel" is enabled/disabled, this is indicated in the NCI by the note [HR] after the selected axis.

Form Cutter

- For form relief surfaces, the "support points of gradients" can now be set automatically according to the "profile points," similar to the area selection in relief surfaces, which has been possible for some time.

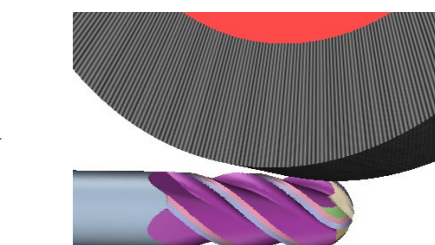
Probing



- The "Probe runout" machining step is now available. Currently, however, only the "Probe on cutting" and "Probe on blank" can be performed.
- It is now possible to probe the programmed core progression in the "In-Process Measurement" step. This involves measuring all the programmed progression points of the core diameter progression and applying a corresponding compensation.
- Similar to probing the core diameter progression, the diameter progression after cylindrical grinding can now be measured at several points and automatically compensated.

3D Simulation

- If a grinding wheel is defined as a brush, it is now visualized in the 3D view with a special texture.



Further information about the new features of version 5.2.0 can be found on our website.

www.numroto.com